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**EUROPEAN PATENT APPLICATION**

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(54) **Biosynthetic osteogenic proteins and osteogenic devices containing them**

(57) Disclosed are 1) osteogenic devices comprising a matrix containing osteogenic protein and methods of inducing endochondral bone growth and cartilage in mammals using the devices; 2) amino acid sequence data, amino acid composition; solubility properties.

structural features, homologies and various other data characterizing osteogenic proteins, 3) methods of producing osteogenic proteins using recombinant DNA technology, and 4) osteogenically and chondrogenically active synthetic protein constructs.

FIG. 1-1

FIG. 1-1

	VG1	DPP	OP1	CBMP2	CBMP3	beta-	TGP-	MIS	alpha:	consensus
	COP1	COP5		a)	b):	(bov)	Inhibin	beta:	Inhib:	choices
	COP3	COP7:		a)	b)			1 2 3:		
	COP4									
			C	C	C	C	C	C	C	c
			K	K	K	K	K	C	C	k,r
P P	P P	P P	K	K	K	K	K	V L V:	L	k,r
N N	N N	N N	R	H	H	H	K	R	V	h,k,r,q
G G	G G	G G	H	S	E	P	S	Y	Q	p,s,e,q
L L	L L	L L	L	L	L	L	P	L	L	l
Y Y	Y Y	Y Y	Y	Y	Y	Y	K	F	F	y,f
V V	V V	V V	V	V	V	V	V	V	I	v,i
D D	D D	D D	E	D	S	D	D	D	S	d,e,s
F F	F F	F F	F	F	F	F	F	F	L	f
Q Q	S S	S S	K	S	R	S	A	K	R	k,r,s
R R								K	R	
D D	D D	D D	D	D	D	D	D	D	E	d
V V	V V	V V	V	V	L	V	I	I	L	v,l,i
G G	G G	G G	G	G	G	G	G	G	S	g
W W	W W	W W	W	W	W	W	W	W		w
D D	D D	D N	Q	D	Q	N	S	N	K	q,n,d,e,s
D D	D D	D D	N	D	D	D	E	D	W	d,e,n
W W	W W	W W	W	W	W	W	W	W		w
I I	I I	I I	V	I	I	I	I	I	I	i,v
I V	V V	V V	I	V	I	V	I	I	H	i,v
A A	A A	A A	A	A	A	A	S	A	A	a,s
P P	P P	P P	P	P	P	P	P	P	P	p
V P	P P	P P	Q	L	E	P	K	S	T	e,q,p*
D G	G G	G G	G	G	G	G	S	G	G	g,s
F Y	Y Y	Y Y	Y	Y	Y	Y	F	Y	Y	y,f
D Q	Q Q	Q Q	M	D	V	H	D	H	Y	h,d,n,q,y*
A A	A A	A A	A	A	A	A	A	A	A	a

FIG. 1-2

Y	F	F	F	N	Y	Y	F	:	Y	N	N	N	:	N	H	:	Y,f,n
Y	Y	Y	Y	Y	Y	Y	Y	:	Y	Y	Y	Y	:	Y	Y	:	f,h,n
C	C	C	C	C	C	C	C	:	C	C	C	C	:	C	C	:	C,e,h,n
S	S	S	S	S	S	S	S	:	S	S	S	S	:	S	S	:	S,g
G	G	G	G	G	G	G	G	:	G	G	G	G	:	G	G	:	G,e,s*
A	A	A	A	A	A	A	A	:	A	A	A	A	:	A	A	:	A,c
C	C	C	C	C	C	C	C	:	C	C	C	C	:	C	C	:	C,p,s,g,q
Q	Q	Q	Q	Q	Q	Q	Q	:	Q	Q	Q	Q	:	Q	Q	:	Q,f,y
T	T	T	T	T	T	T	T	:	T	T	T	T	:	T	T	:	T,p
L	L	L	L	L	L	L	L	:	L	L	L	L	:	L	L	:	L,m,i
V	V	V	V	V	V	V	V	:	V	V	V	V	:	V	V	:	V,p,s,s,t
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,d,e,s,s,q*
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,h,r,n,s*
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,m,l,f,p,s,a
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,k
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,s,a,p,g
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,t,s,a
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,n
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,h
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,t,s
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,i,w,t
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,v,i,l
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,q,n
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,t,s,s,g
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,i
N	N	N	N	N	N	N	N	:	N	N	N	N	:	N	N	:	N,h,n

FIG. 1-3

N	N	N	S	S	I	N	P	S	:	A	R	Q	Q	S	:	n,s
M	M	S	S	S	I	N	P	S	:	V	G	H	H	L	:	i,v,l
M	M	N	N	N	E	N	I	N	:	G	H	S	L	L	:	v
									:	V	V		A	A	:	
P	P	S	S	S	P	P	P	S	:	P	P	P	P	P	:	p,s
G	G	G	G	G	E	G	E	S	:	G	F	G	E	G	:	e
									:						:	
K	K	K	K	K	Q	K	T	S	:	I	N	K	A	R	:	k,q,t,s
V	V	P	P	P	P	V	P	K	:	P	E	K	S	P	:	i,v,l
P	P	P	P	P	P	P	P	K	:	P	P	K	S	P	:	p,s
P	P	P	P	P	P	P	P	K	:	P	P	K	S	P	:	k
C	C	C	C	C	C	C	C	C	:	C	C	C	C	C	:	a,p,s
C	C	C	C	C	C	C	C	C	:	C	C	C	C	C	:	c
C	C	C	C	C	C	C	C	C	:	C	C	C	C	C	:	v,s,i
V	V	P	P	P	P	P	P	P	:	V	P	P	P	P	:	p,s
P	P	T	T	T	T	T	T	T	:	P	T	T	T	T	:	t,e,q
L	L	S	S	S	S	S	S	S	:	K	M	S	R	L	:	g,e,d,k
S	S	A	A	A	A	A	A	A	:	S	S	P	M	T	:	l,m
A	A	I	I	I	I	I	I	I	:	S	S	P	M	T	:	s,n,e,d
I	I	S	S	S	S	S	S	S	:	S	S	P	M	T	:	s,s,p,t
S	S	M	M	M	M	M	M	M	:	I	M	S	P	T	:	l,m,w
L	L	L	L	L	L	L	L	L	:	P	L	L	L	L	:	s,e,p,t
L	L	L	L	L	L	L	L	L	:	P	L	L	L	L	:	e
L	L	L	L	L	L	L	L	L	:	P	L	L	L	L	:	l,v,i
L	L	L	L	L	L	L	L	L	:	P	L	L	L	L	:	y,f
L	L	L	L	L	L	L	L	L	:	P	L	L	L	L	:	i,l,y
D	D	L	L	L	L	L	L	L	:	D	D	D	D	D	:	d,n
D	D	L	L	L	L	L	L	L	:	D	D	D	D	D	:	d,e
E	E	L	L	L	L	L	L	L	:	E	E	E	E	E	:	n,q,y
E	E	L	L	L	L	L	L	L	:	E	E	E	E	E	:	e,d,s
E	E	L	L	L	L	L	L	L	:	E	E	E	E	E	:	

FIG. 1-4

K	K	K	K	K	:	N	T	N	K	:	N	N	N	P	:	I	G	:	n,k
V	V	V	V	V	:	V	V	V	V	:	V	I	I	K	:	S	G	:	v,i
V	V	V	V	V	:	V	V	I	V	:	V	I	V	V	I	V	A	:	v,i
L	L	L	L	L	:	L	L	L	L	:	L	K	K	E	:	H	S	:	l
K	K	K	K	K	:	R	K	K	K	:	K	K	R	Q	:	H	F	:	k,r
N	N	N	N	N	:	K	N	K	N	:	V	D	D	L	:	V	K	:	n,d,k*
Y	Y	Y	Y	Y	:	Y	Y	Y	Y	:	Y	I	V		:		Y	:	y
Q	Q	Q	Q	Q	:	E	Q	R	Q	:	P	Q	P	S	:	P	E	:	q,e,p,r
					:					:					:			:	
E	E	E	E	E	:	N	E	N	D	E	:	N	N	N	:	N	N	:	n,d,e
M	M	M	M	M	:	M	M	M	M	:	M	M	M	M	:	M	L	:	m
V	V	V	V	V	:	V	V	V	V	:	T	I	I	I	:	V	L	:	v,i,t,a
V	V	V	V	V	:	A	V	V	V	:	V	V	V	V	:	A	T	:	v
E	E	E	E	E	:	D	V	R	E	:	E	E	E	R	K	K	T	:	e,d,r,k,
G	G	G	G	G	:	E	G	A	G	:	S	E	E	S	:	E	H	:	g,a,s,e
C	C	C	C	C	:	C	C	C	C	:	C	C	C	C	:	C	C	:	c
G	G	G	G	G	:	G	G	G	G	:	H	G	G	K	:	G	A	:	g,h
C	C	C	C	C	:	C	C	C	C	:	C	C	C	C	:	C	C	:	c
R	R	R	R	R	:	R	R	H	R	:	R	S	A	S	:	R	I	:	r,h,s,a,



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Application Number  
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<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

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